

**Amendments to the Claims:**

This listing of claims will replace all prior listings, and versions, of claims in the application.

**Listing of Claims**

1. (currently amended) A method comprising the steps of:
  - (a) providing cognitive training to an animal during rehabilitation of said animal from stroke ~~and after the acute phase of said stroke in said animal has ended~~ under conditions sufficient to produce an improvement in performance by said animal of a cognitive task whose deficit is associated with said stroke;
  - (b) administering a phosphodiesterase 4 inhibitor to said animal ~~before, during or after said providing step, a phosphodiesterase 4 inhibitor which enhances CREB pathway function, wherein said administering occurs~~ during rehabilitation of said animal from stroke ~~and after the acute phase of said stroke in said animal has ended,~~ wherein said inhibitor is administered in conjunction with said cognitive training and enhances CREB pathway function during said cognitive training;
  - (c) repeating said providing and said administering of steps (a) and (b) one or more times; and
  - (d) producing a long-lasting performance gain relative to the performance of said cognitive task achieved by training alone.
2. (withdrawn) The method of claim 1 wherein said animal has undergone neuronal stem cell manipulation.
3. (canceled)
4. (previously presented) The method of claim 1 wherein in step b), cognitive training comprises multiple training sessions.
5. (previously presented) The method of claim 4 wherein said phosphodiesterase 4 inhibitor is administered before and during each training session.
6. (original) The method of claim 1 wherein said animal is a mammal.

7. (original) The method of claim 6 wherein said mammal is a human.
8. (previously presented) The method of claim 1 wherein said phosphodiesterase 4 inhibitor induces CREB-dependent gene expression.
9. (withdrawn) The method of claim 8 wherein said augmenting agent up-regulates a positive effector of CREB pathway function.
10. (withdrawn) The method of claim 9 wherein said positive effector of CREB pathway function is a CREB activator.
11. (canceled)
12. (withdrawn) The method of claim 11 wherein said negative effector of CREB pathway function is a CREB repressor.
13. (withdrawn) The method of claim 1 wherein said augmenting agent is a CREB functional modulator.
- 14-20. (canceled)
21. (withdrawn) The method of claim 20 wherein said augmenting agent up-regulates a positive effector of CREB pathway function.
22. (withdrawn) The method of claim 21 wherein said positive effector of CREB pathway function is a CREB activator.
23. (canceled)
24. (withdrawn) The method of claim 23 wherein said negative effector of CREB pathway function is a CREB repressor.
25. (withdrawn) The method of claim 14 wherein said augmenting agent is a CREB functional modulator.

**26.** (withdrawn) A method of treating a cognitive deficit associated with age-associated memory impairment in an animal in need of said treatment comprising the steps of:

- (a) administering to said animal an augmenting agent which enhances CREB pathway function; and
- (b) training said animal under conditions sufficient to produce an improvement in performance by said animal of a cognitive task whose deficit is associated with age-associated memory impairment, whereby said cognitive deficit is treated.

**27.** (withdrawn) The method of claim 26 wherein a performance gain is achieved relative to the performance of said cognitive task achieved by training alone.

**28.** (withdrawn) The method of claim 26 wherein in step b), training comprises multiple training sessions.

**29.** (withdrawn) The method of claim 28 wherein said augmenting agent is administered before and during each training session.

**30.** (withdrawn) The method of claim 26 wherein said animal is a mammal.

**31.** (withdrawn) The method of claim 30 wherein said mammal is a human.

**32.** (withdrawn) The method of claim 26 wherein said augmenting agent induces CREB-dependent gene expression.

**33.** (withdrawn) A method of treating a cognitive deficit associated with a neurodegenerative disease in an animal in need of said treatment comprising the steps of:

- (a) administering to said animal an augmenting agent which enhances CREB pathway function; and
- (b) training said animal under conditions sufficient to produce an improvement in performance by said animal of a cognitive task whose deficit is associated with said neurodegenerative disease, whereby said cognitive deficit is treated.

34. (withdrawn) The method of claim 33 wherein a performance gain is achieved relative to the performance of said cognitive task achieved by training alone.
35. (withdrawn) The method of claim 33 wherein said neurodegenerative disease is selected from the group consisting of: delirium, dementia, Alzheimer's disease, Parkinson's disease and Huntington's disease.
36. (withdrawn) The method of claim 33 wherein in step b), training comprises multiple training sessions.
37. (withdrawn) The method of claim 36 wherein said augmenting agent is administered before and during each training session.
38. (withdrawn) The method of claim 33 wherein said animal is a mammal.
39. (withdrawn) The method of claim 38 wherein said mammal is a human.
40. (withdrawn) The method of claim 33 wherein said augmenting agent induces CREB-dependent gene expression.
41. (withdrawn) A method of treating a cognitive deficit associated with a psychiatric disease in an animal in need of said treatment comprising the steps of:
- (a) administering to said animal an augmenting agent which enhances CREB pathway function; and
  - (b) training said animal under conditions sufficient to produce an improvement in performance by said animal of a cognitive task whose deficit is associated with said psychiatric disease, whereby said cognitive deficit is treated.
42. (withdrawn) The method of claim 41 wherein a performance gain is achieved relative to the performance of said cognitive task achieved by training alone.
43. (withdrawn) The method of claim 41 wherein said psychiatric disease is selected from the group consisting of: depression, schizophrenia, autism and attention deficit disorder.

- 44.** (withdrawn) The method of claim 41 wherein in step b), training comprises multiple training sessions.
- 45.** (withdrawn) The method of claim 44 wherein said augmenting agent is administered before and during each training session.
- 46.** (withdrawn) The method of claim 41 wherein said animal is a mammal.
- 47.** (withdrawn) The method of claim 46 wherein said mammal is a human.
- 48.** (withdrawn) The method of claim 41 wherein said augmenting agent induces CREB-dependent gene expression.
- 49-58.** (canceled)
- 59.** (withdrawn) The method of claim 57 wherein said trauma dependent loss of function is selected from the group consisting of: head trauma and brain trauma.
- 60-64.** (canceled)
- 65.** (withdrawn) A method of treating a cognitive deficit associated with a genetic defect in an animal in need of said treatment comprising the steps of:
- (a) administering to said animal an augmenting agent which enhances CREB pathway function; and
  - (b) training said animal under conditions sufficient to produce an improvement in performance by said animal of a cognitive task associated with said genetic defect, whereby said cognitive deficit is treated.
- 66.** (withdrawn) The method of claim 65 wherein a performance gain is achieved relative to the performance of said cognitive task achieved by training alone.
- 67.** (withdrawn) The method of claim 65 wherein said genetic defect is selected from the group consisting of: Rubinstein-Taybi syndrome and down syndrome.

- 68.** (withdrawn) The method of claim 65 wherein in step b), training comprises multiple training sessions.
- 69.** (withdrawn) The method of claim 68 wherein said augmenting agent is administered before and during each training session.
- 70.** (withdrawn) The method of claim 65 wherein said animal is a mammal.
- 71.** (withdrawn) The method of claim 70 wherein said mammal is a human.
- 72.** (withdrawn) The method of claim 65 wherein said augmenting agent induces CREB-dependent gene expression.
- 73.** (withdrawn) A method of improving learning in an animal with a learning disability comprising the steps of:
- (a) administering to said animal an augmenting agent which enhances CREB pathway function; and
  - (b) training said animal under conditions sufficient to produce an improvement in performance by said animal of a cognitive task whose deficit is associated with said learning disability, whereby learning is improved.
- 74.** (withdrawn) The method of claim 73 wherein a performance gain is achieved relative to the performance of said cognitive task achieved by training alone.
- 75.** (withdrawn) The method of claim 73 wherein in step b), training comprises multiple training sessions.
- 76.** (withdrawn) The method of claim 75 wherein said augmenting agent is administered before and during each training session.
- 77.** (withdrawn) The method of claim 73 wherein said animal is a mammal.
- 78.** (withdrawn) The method of claim 77 wherein said mammal is a human.

**79.** (withdrawn) The method of claim 73 wherein said augmenting agent induces CREB-dependent gene expression.

**80.** (withdrawn) A method for repeated stimulation of neuronal activity or a pattern of neuronal activity in an animal comprising the steps of:

- (a) administering to said animal an augmenting agent which enhances CREB pathway function; and
- (b) training said animal under conditions sufficient to stimulate neuronal activity or a pattern of neuronal activity in said animal.

**81.** (withdrawn) The method of claim 80 wherein in step b), training comprises multiple training sessions.

**82.** (withdrawn) The method of claim 81 wherein said augmenting agent is administered before and during each training session.

**83.** (withdrawn) The method of claim 80 wherein said animal is a mammal.

**84.** (withdrawn) The method of claim 83 wherein said mammal is a human.

**85.** (withdrawn) The method of claim 80 wherein said augmenting agent induces CREB-dependent gene expression.

**86.** (withdrawn) A method of therapy of a cognitive deficit associated with a central nervous system disorder or condition in an animal having undergone neuronal stem cell manipulation comprising the steps of:

- (a) administering to said animal an augmenting agent which enhances CREB pathway function; and
- (b) training said animal under conditions sufficient to stimulate neuronal activity or a pattern of neuronal activity in said animal.

**87.** (withdrawn) The method of claim 86 wherein training in step b) further produces an improvement in performance by said animal of a cognitive task whose deficit is associated with said central nervous system disorder or condition.

**88.** (withdrawn) The method of claim 87 wherein a performance gain is achieved relative to the performance of said cognitive task achieved by training alone.

**89.** (withdrawn) The method of claim 86 wherein in step b), training comprises multiple training sessions.

**90.** (withdrawn) The method of claim 89 wherein said augmenting agent is administered before and during each training session.

**91.** (withdrawn) The method of claim 86 wherein said animal is a mammal.

**92.** (withdrawn) The method of claim 91 wherein said animal is a human.

**93.** (withdrawn) The method of claim 86 wherein said augmenting agent induces CREB-dependent gene expression.

**94-99.** (canceled)

**100.** (currently amended) The method of claim ~~98~~ 1 wherein in step ~~(b)~~ (a), cognitive training comprises multiple training sessions.

**101.** (currently amended) The method of claim ~~98~~ 1 wherein said phosphodiesterase 4 inhibitor is administered before and during each training session.

**102.** (currently amended) The method of claim ~~98~~ 1 wherein said animal is a mammal.

**103.** (previously presented) The method of claim 102 wherein said mammal is a human.

**104.** (currently amended) The method of claim ~~98~~ 1 wherein said phosphodiesterase 4 inhibitor induces CREB-dependent gene expression.

**105-106.** (canceled)



**107.** (new) A method comprising the steps of:

- (a) providing cognitive training to a patient who has suffered impaired cognitive function after a stroke under conditions sufficient to produce an improvement in performance by said patient of a cognitive task whose deficit is associated with said stroke;
- (b) administering a phosphodiesterase 4 inhibitor training to said patient, wherein the inhibitor is administered in conjunction with said cognitive training and enhances CREB pathway function during said cognitive training;
- (c) repeating said providing and said administering of steps (a) and (b) one or more times; and
- (d) producing a long-lasting performance gain relative to the performance of said cognitive task achieved by training alone.

**108.** (new) A method comprising the steps of:

- (a) providing cognitive training to a patient who has suffered impaired sensory-motor function after a stroke under conditions sufficient to produce an improvement in performance by said patient of a cognitive task whose deficit is associated with said stroke;
- (b) administering a phosphodiesterase 4 inhibitor to said patient, wherein the inhibitor is administered in conjunction with said cognitive training and enhances CREB pathway function during said cognitive training;
- (c) repeating said providing and said administering of steps (a) and (b) one or more times; and
- (d) producing a long-lasting performance gain relative to the performance of said cognitive task achieved by training alone.